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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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CUMMINS, INC.			SCHINDLER, DAVID M	
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INDIANAPOLIS, IN 46204			PAPER NUMBER	

2862

DATE MAILED: 05/10/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/628,606

Applicant(s)

MANRING ET AL.

Examiner

David Schindler

Art Unit

2862

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-24 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-24 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 28 July 2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f):
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Bot Ledynh
Primary Examiner

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 7/28/03.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: ____.

DETAILED ACTION

Drawings

1. The drawings are objected to because 1) (22) and (24) appear to point to the same thing in Figure 1, 2) the difference between (22) and (20) in Figure 2 is not clear in terms of what components and features are included with these reference numbers, 3) (60) in Figures 2-5 is not mentioned in the specification. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.
2. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, "the flux coil leads

Art Unit: 2862

coupling the flux coil to the monitoring device" in Claim 17 must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Objections

3. Claims 1, 21, 22, and 23 are objected to because of the following informalities:

As to Claim 1,

The phrase "the flux rise and energy loss" on lines 1-2 lacks antecedent basis.

Art Unit: 2862

The phrase "a flux path closure device having an external shape conforming in a least two locations to the external shape of the magnetic component" on lines 4-5 is unclear as it is not clear how the external shape of the flux path closure device is conforming in at least two locations.

The phrase "the part" on line 8 lacks antecedent basis.

As to Claim 21,

The phrase "the excitation coils" appearing twice on line 2 is unclear and lacks antecedent basis. Claim 1, which Claim 21 depends from, discloses only one excitation coil.

The phrase "the voltage" on line 1 lacks antecedent basis.

The phrase "the current" on line 2 lacks antecedent basis.

As to Claims 22 and 23,

The phrase "the magnetic flux" on line 2 lacks antecedent basis.

Appropriate correction is required.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Art Unit: 2862

5. Claims 1, 15, and 17 are rejected under 35 U.S.C. 102(e) as being anticipated by Sekiya (2002/0163330).

As to Claim 1,

Sekiya discloses a flux path closure device ((10) and (Page 3, Right Column, Paragraph [0030], Lines 1-3) and Figures 1 and 2) having an external shape conforming in at least two locations to the external shape of the magnetic component (11) permitting the flux path closure device to be positioned adjacent the magnetic component so as to form a closed flux path through the flux path closure device and the magnetic component (Figure 2), an excitation coil (13) configured to excite flux in the part and the flux path closure device through the closed flux path upon excitation of the excitation coil ((Figure 2) and (Page 4, Left Column, Lines 1-5)), a signal source (30) in electrical communication with the excitation coil (Figure 2), the signal source being configured to generate an excitation signal to the excitation coil ((Page 3, Right Column, Last Line) and (Page 4, Left Column, Line 1) and (Figure 2)), excitation leads (the wire between coil (13) and current controller (30)) extending between and electrically coupling the excitation coil to the signal source (Figure 2), and a monitoring device (40) for monitoring flux through the closed flux path (Page 4, Left Column, Paragraph [0033], Lines 8-12).

Sekiya does not explicitly disclose the excitation coil having terminals. However, in the excitation coil must have terminals in order to connect to the current generator (30).

As to Claim 15,

Art Unit: 2862

Sekiya discloses the excitation coil (13) is attached to the flux path closure device (12) (Figure 2).

As to Claim 17,

Sekiya discloses a flux coil (14) separate from the excitation coil and flux coil leads (the wire between coil (14) and magnetic flux calculator (40)) coupling the flux coil to the monitoring device (40).

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 2-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sekiya (2002/0163330) in view of Burd (WO 02/097424).

As to Claim 2,

Sekiya discloses as explained above.

Sekiya does not disclose the flux path closure device is fabricated from a material that suppresses eddy current therein.

Burd discloses the flux path closure device (12) is fabricated from a material that suppresses eddy current therein (Page 5, Lines 14-15).

It would have been obvious at the time of the invention to modify Sekiya to include the flux path closure device is fabricated from a material that suppresses eddy

Art Unit: 2862

current therein as taught by Burd in order to produce clear and precise results (Page 5, Last Line).

As to Claim 3.

Sekiya does not disclose the flux path closure device is fabricated from laminated materials.

Burd discloses the flux path closure device (12) is fabricated from laminated materials (Page 5, Lines 14-15).

It would have been obvious at the time of the invention to modify Sekiya to include the flux path closure device is fabricated from laminated materials as taught by Burd in order to produce clear and precise results (Page 5, Last Line).

As to Claim 4.

Sekiya does not disclose the flux path closure device is fabricated from insulated powders.

Burd discloses the flux path closure device (12) is fabricated from insulated powders (Page 5, Lines 16-18).

It would have been obvious at the time of the invention to modify Sekiya to include the flux path closure device is fabricated from insulated powders as taught by Burd in order to produce even clearer and more precise results (Page 5, Last Line).

8. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sekiya (2002/0163330) in view of Burd (WO 02/097424) and in further view of Spencer et al. (2004/0152261).

Art Unit: 2862

Sekiya in view of Burd discloses explained above.

Burd discloses the flux path closure device is fabricated from pressed metal (iron) particles which are coated with a non-conducting material (Page 5, Lines 16-18).

It would have been obvious at the time of the invention to modify Sekiya to include the flux path closure device is fabricated from pressed metal (iron) particles which are coated with a non-conducting material as taught by Burd in order to produce even clearer and more precise results (Page 5, Last Line).

Sekiya in view of Burd does not disclose that the non-conducting material is an oxide.

Spencer et al. discloses non-conductive oxides (Page 3, Left Column, Paragraph [0031], Line 19).

It would have been obvious at the time of the invention to modify Sekiya in view of Burd to include non-conductive oxides as taught by Spencer et al. in order to have a magnetic shielding (Page 3, Left Column, Paragraph [0031], Lines 18-19).

9. Claims 6-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sekiya (2002/0163330) in view of Lavan, Jr. et al. (5,729,134).

As to Claim 6.

Sekiya discloses as explained above.

Sekiya does not disclose the signal generated by the signal source is a transient signal.

Lavan, Jr. et al. discloses the signal generated by the signal source is a transient

Art Unit: 2862

signal (Abstract, Lines 4-6).

It would have been obvious at the time of the invention to modify Sekiya to include the signal generated by the signal source is a transient signal as taught by Lavan, Jr. et al. in order to cause a rapid current pulse rise time in a coil (Abstract, Lines 4-6).

As to Claim 7,

Sekiya does not disclose the signal generated by the signal source is a voltage signal.

Lavan, Jr. et al. discloses the signal generated by the signal source is a voltage signal (Abstract, Lines 4-6).

It would have been obvious at the time of the invention to modify Sekiya to include the signal generated by the signal source is a voltage signal as taught by Lavan, Jr. et al. in order to cause a rapid current pulse rise time in a coil (Abstract, Lines 4-6).

As to Claim 8,

Sekiya discloses the signal generated by the signal source is a current signal (Abstract, Lines 3-5).

10. Claims 9 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sekiya (2002/0163330) in view of Judd et al. (4,922,197).

As to Claim 9,

Sekiya discloses as explained above.

Sekiya does not disclose a spacer configured to be juxtaposed between the flux

Art Unit: 2862

closure device and the magnetic component to have the closed flux path extending through the spacer.

Juds et al. discloses a spacer (54) configured to be juxtaposed between the flux closure device (10) and the magnetic component (26) to have the closed flux path extending through the spacer (Figure 5).

It would have been obvious at the time of the invention to modify Sekiya to include a spacer configured to be juxtaposed between the flux closure device and the magnetic component to have the closed flux path extending through the spacer as taught by Juds et al. in order to prevent debris from causing damage to the sensor.

As to Claim 10,

Sekiya does not disclose the spacer is non-magnetic.

Juds et al. discloses the spacer (54) is non-magnetic (non-ferrous stainless steel) (Column 5, Lines 13-14).

It would have been obvious at the time of the invention to modify Sekiya to include the spacer is non-magnetic as taught by Juds et al. in order to prevent the spacer from generating or guiding a magnetic flux which could interfere with the functionality of the device.

11. Claims 11-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sekiya (2002/0163330) in view of Juds et al. (4,922,197) and in further view of Pearson et al. (2002/0179830).

As to Claim 11,

Sekiya in view of Juds et al. discloses as explained above.

Sekiya in view of Juds et al. does not disclose the spacer is non-conductive.

Pearson et al. discloses the spacer is non-conductive (Page 3, Right Column, Top Paragraph, Lines 8-10).

It would have been obvious at the time of the invention to modify Sekiya in view of Juds et al. to include the spacer is non-conductive as taught by Pearson et al. in order to prevent the spacer from generating or guiding a magnetic flux which could interfere with the functionality of the device.

As to Claim 12,

Sekiya does not disclose the spacer is non-magnetic.

Juds et al. discloses the spacer (54) is non-magnetic (non-ferrous stainless steel) (Column 5, Lines 13-14).

It would have been obvious at the time of the invention to modify Sekiya to include the spacer is non-magnetic as taught by Juds et al. in order to prevent the spacer from generating or guiding a magnetic flux which could interfere with the functionality of the device.

As to Claim 13,

Sekiya in view of Juds et al. does not disclose the spacer is ceramic.

Pearson et al. discloses the spacer is ceramic (Page 3, Right Column, Paragraph [0024], Lines 9-15).

It would have been obvious at the time of the invention to modify Sekiya in view of Juds et al. to include the spacer is ceramic as taught by Pearson et al. in order to use

a material without appreciable magnetic susceptibility (Page 3, Right Column, Paragraph [0024], Lines 9-15).

As to Claim 14,

Sekiya in view of Juds et al. does not disclose the spacer is glass.

Pearson et al. discloses the spacer is glass (Page 3, Right Column, Paragraph [0024], Lines 9-15).

It would have been obvious at the time of the invention to modify Sekiya in view of Juds et al. to include the spacer is glass as taught by Pearson et al. in order to use a material without appreciable magnetic susceptibility (Page 3, Right Column, Paragraph [0024], Lines 9-15).

12. Claims 16 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sekiya (2002/0163330) in view of Lysen (4,804,912).

As to Claim 16,

Sekiya discloses as explained above.

Sekiya does not disclose the excitation leads extend through the flux path closure device.

Lysen discloses the excitation leads (35) extend through the flux path closure device (T with housing (22)) (Figure 1).

It would have been obvious at the time of the invention to modify Sekiya to include the excitation leads extend through the flux path closure device as taught by

Art Unit: 2862

Lysen in order to connect a coil with a source (source of alternating current) (Column 4, Lines 26-28).

As to Claim 20,

Sekiya does not disclose the flux coil leads extend through the flux path closure device.

Lysen discloses the flux coil leads (36) extend through the flux path closure device (T with housing (22)) (Figure 1).

It would have been obvious at the time of the invention to modify Sekiya to include the flux coil leads extend through the flux path closure device in order to couple the flux coil (secondary coil) to a monitoring device (electronic unit) (Column 4, Lines 28-31).

13. Claims 18 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sekiya (2002/0163330) in view of Linder (4,475,083).

As to Claim 18,

Sekiya discloses as explained above.

Sekiya does not disclose the flux coil has less than three turns.

Linder disclose the flux coil has less than three turns (Column 8, Lines 20-22).

It would have been obvious at the time of the invention to modify Sekiya to include the flux coil has less than three turns as taught by Linder in order to reduce amount of material needed for the coil.

As to Claim 19,

Sekiya does not disclose the flux coil has a single turn.

Linder discloses the flux coil has a single turn (Column 8, Lines 20-22).

It would have been obvious at the time of the invention to modify Sekiya to include the flux coil has a single turn as taught by Linder in order to reduce amount of material needed for the coil.

14. Claims 21-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sekiya (2002/0163330) in view of Rossi et al. (2002/0084777).

As to Claim 21,

Sekiya discloses as explained above.

Sekiya does not disclose the monitoring device monitors the voltage across the terminals of the excitation coils and the current through the excitation coils.

Rossi et al. discloses the monitoring device (11) monitors the voltage across the terminals of the excitation coil and the current through the excitation coil ((Page 2, Left Column, Paragraph [0024]) and (Page 3, Left Column, Paragraph [0032])).

It would have been obvious at the time of the invention to modify Sekiya to include the monitoring device monitors the voltage across the terminals of the excitation coils and the current through the excitation coils as taught by Rossi et al. in order calculate flux fairly accurately and fast (Page 3, Left Column, Paragraph [0034], Lines 1-2).

As to Claim 22,

Sekiya does not disclose the monitoring device includes calculation circuitry for calculating the magnetic flux in the closed flux path from the monitored voltage and current.

Rossi et al. discloses the monitoring device (11) includes calculation circuitry (15) for calculating the magnetic flux in the closed flux path from the monitored voltage and current ((Figure 4) and (Page 2, Left Column, Paragraph [0024]) and (Page 3, Left Column, Paragraph [0032])).

It would have been obvious to modify Sekiya to include the monitoring device includes calculation circuitry for calculating the magnetic flux in the closed flux path from the monitored voltage and current as taught by Rossi et al. in order to calculate flux fairly accurately and fast (Page 3, Left Column, Paragraph [0034], Lines 1-2).

As to Claim 23,

Sekiya does not disclose the excitation coil has a number of turns and a measured resistance and the calculation circuitry calculates the magnetic flux using the number of turns and the resistance.

Rossi et al. discloses the excitation coil (17) has a number of turns and a measured resistance and the calculation circuitry (15) calculates the magnetic flux using the number of turns and the resistance ((Figure 4) and (Page 2, Left Column, Paragraph [0024]) and (Page 3, Left Column, Paragraph [0032])).

It would have been obvious at the time of the invention to modify Sekiya to include the excitation coil has a number of turns and a measured resistance and the calculation circuitry calculates the magnetic flux using the number of turns and the

Art Unit: 2862

resistance as taught by Rossi et al. in order to calculate flux fairly accurately and fast (Page 3, Left Column, Paragraph [0034], Lines 1-2).

15. Claim 24 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sekiya (2002/0163330) in view of Rossi et al. (2002/0084777) and in further view of Singer et al. (6,314,473).

Sekiya in view of Rossi et al. discloses as explained above.

Sekiya in view of Rossi et al. does not disclose the monitoring device includes integration circuitry for integrating the monitored voltage and current over time and the calculation circuitry calculates an effective resistance for the coil based upon the integrated monitored voltage and the integrated monitored current.

Singer et al. discloses the monitoring device includes integration circuitry for integrating the monitored voltage and current over time and the calculation circuitry calculates an effective resistance for the coil based upon the integrated monitored voltage and the integrated monitored current ((Column 5, Lines 28-40) and (Column 41, Lines 22-36)).

It would have been obvious at the time of the invention to modify Sekiya in view of Rossi et al. to include the monitoring device includes integration circuitry for integrating the monitored voltage and current over time and the calculation circuitry calculates an effective resistance for the coil based upon the integrated monitored voltage and the integrated monitored current as taught by Singer et al. in order to determine energy losses due to resistance (Column 41, Lines 14-17).

Conclusion

16. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. U.S. Pat. No. 5,394,084 to Synder which discloses an eddy-current apparatus having a spacer.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to David Schindler whose telephone number is (571) 272-2112. The examiner can normally be reached on M-F (8:00 - 5:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward Lefkowitz can be reached on (571) 272-2180. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



David Schindler



Bot Ledyne
Primary Examiner